

**UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98055-4056**

In the matter of the petition of

**BOEING COMMERCIAL AIRPLANE
GROUP**

Regulatory Docket No. 27662

for an exemption from §§ 25.807(c)(1) and
25.809(f) of the Federal Aviation Regulations

PARTIAL GRANT OF EXEMPTION

By letters B-T02T-94-0437 dated March 14, 1994, and B-T02T-94-0986 dated May 26, 1994, Mr. K. B. Buchanan, Manager, Certification, B-T02T, 05-02, Everett Division, 747/767 Programs, Boeing Commercial Airplane Group, P.O. Box 3707, Seattle, Washington 98124-2207, petitioned for an exemption from the requirements of §§ 25.807(c)(1) and 25.809(f) for the Model 767-300F freighter airplane, to allow the carriage of up to five persons in addition to two crewmembers in the flight compartment of the airplane.

Sections of the FAR affected:

Section 25.807(c)(1), as amended by Amendment 25-39, requires, in pertinent part, that for seating configurations of up to nine passengers (excluding crewmember seats), a Type IV emergency exit must be provided on each side of the fuselage.

Section 25.809(f), as amended by Amendment 25-34, requires that at the pertinent exits, an approved means be provided to assist occupants in descending to the ground. For passengers, § 25.809(f)(1) requires a self-supporting slide, or equivalent, of certain specified characteristics at each passenger emergency exit.

For flightcrew, § 25.809(f)(2) requires a rope or other means demonstrated to be suitable at flightcrew emergency exits. (The requirements of § 25.809(f)(1) and (2) as amended by Amendment 25-34 are currently found in § 25.810(a)(1) and (2), respectively.)

Related Sections of the FAR

Although not specifically addressed by the petitioner, § 25.857(e), as amended by Amendment 25-32, requires, in pertinent part, that a Class E cargo compartment is one on airplanes used only for the carriage of cargo.

Section 121.583(a) contains, in pertinent part, a listing of categories of people who may be carried aboard an airplane in part 121 service without complying with all the passenger-carrying airplane requirements of part 121.

The petitioner's supportive information is as follows:

"Boeing hereby petitions for exemption from FAR 25.807(c)(1) Amendment 39 and 25.809(f) Amendment 34 to permit type certification of the Boeing Model 767-300F (Freighter) for carriage of up to five persons in addition to two flight crew members in the flight compartment of the airplane.

"Justification for the exemption of FAR 25.807(c)(1) and FAR 25.809(f) is that there are three escape routes, all capable of safe egress. The flight compartment on the Model 767-300F is equipped with a crew entry door on the left-hand side of the fuselage. This entry door meets all the applicable requirements of a Type III exit. Additionally, it provides a clear opening of 42 inches wide by 74 inches high and is floor level. There are also left and right flight deck windows which are certified as flight crew emergency exits. The left-hand entry door and the right-hand window are openable from the outside and all three exits are equipped with escape ropes. The flight compartment will be configured with two flight crew seats, up to two observer seats, and three supernumerary seats.

"Boeing proposes that the carriage of the non-flight crew members will be limited by the Airplane Flight Manual to persons as defined in FAR 121.583(a)(1) through (7). There will be further limitations that the operator must (a) instruct the occupants in the use of, and (b) determine that the occupants are physically able to use the escape means provided.

"A ratio of two flight crew members to five persons provides a more than adequate level of management during an emergency evacuation. This was substantiated during the evacuation demonstration of the Model 757-200PF which was conducted on January 14, 1987. The demonstration involved five males and two females ranging in age from 29 to 52 and of varying physical stature. Evacuation of the flight compartment was accomplished by the use of the escape rope through the right-hand flight deck window. All of the evacuees successfully evacuated the flight deck in 73 seconds.

"Cargo operators have a need for a variety of mission support personnel. The safety and efficiency of these cargo missions are dependent upon these support personnel. Such personnel may be needed during flight or at the cargo airplane destination. The surest, most cost-effective way to transport such persons is aboard the particular cargo flight they are to support.

"Therefore, the petition, if granted, will be beneficial in improving the utility of cargo airplanes and increasing the efficiency and safety of their operations, all of which are in the public interest."

"Flight Compartment Configuration

"The Model 767-300F airplane will be configured with three emergency escape exits. The escape means at each of these exits will be an escape rope. The proposed flight compartment, as described above, will also be configured for the carriage of up to five persons in addition to the two flight crew members. The captain, first officer, and first observer seat locations are unchanged and typical of the 767 passenger airplane flight deck configurations. For the 767-300F, one pedestal mounted supernumerary seat will be located aft and slightly outboard of the captain's seat. The three additional supernumerary seats are autofolding and will be located on the rigid barrier. A description of emergency exits, escape means, and supernumerary limitations is as follows.

"Emergency Exits

"Justification for the petition for exemption to FAR 25.807 and 25.809 for the 767-300F is that there are three emergency exits, all capable of safe egress. Section 25.807(c)(1) and (c)(5) requires a minimum of a Type III exit on each side of the fuselage. As identified above, the Model 767-300F is equipped with a floor level crew entry door, located on the left hand side of the fuselage, which is 42 inches wide by 74 inches high (size of a Type A exit). This exit meets all the applicable requirements of a Type III exit. In addition, the left-hand and right-hand flight deck windows comply with flight crew emergency exit requirements. With the exception of external controls for opening the right-hand window from the outside, these emergency exits are unchanged from the 767 passenger airplane. The left-hand crew entry door is also openable from the outside and all three exits are equipped with escape ropes.

"Escape Means

"The Model 767-300F will be configured with three escape ropes. Two ropes are located above the captain and first officer seats for use at the two flight deck windows, as allowed by FAR 25.809(f)(2) for flight crew emergency exits. These ropes and their

location are identical to the 767 passenger configuration. The third escape rope is located above the crew entry door.

"Supernumerary Limitations

"The carriage of the supernumeraries, or non-flight crew members, is proposed to be limited by the Airplane Flight Manual (AFM) to persons as defined in FAR 121.583(a)(1) through (7). Further limitations are proposed that the operator must; (a) instruct the occupants in the use of, and (b) determine that the occupants are physically able to use the escape means provided.

"The ratio of two flight crew members to five supernumeraries on the 767-300F provides a more than adequate level of management during an emergency evacuation. Thus the supernumeraries will possess knowledge, training, and abilities beyond that expected of passengers.

"Comparable Configuration

"The Model 767-300F is similar to the Model 757PF with respect to the number of emergency exits, the escape provisions, and the method for evacuation. The two flight compartments have similar arrangements. The three exits in each configuration, the left-hand and right-hand flight deck windows and crew entry door on the left-hand side of the fuselage, are similarly located. The size of the flight deck window openings are similar between the two models, with the 767-300F windows being slightly larger. The 757PF crew entry door, 22 inch wide by 51 inch high, is inboard opening and has a nine inch step up. The size of the 767-300F entry door is unchanged from the 767 passenger airplane. By comparison to the 757PF, the 767-300F door is wider and taller, is floor level,, and moves upward into the area above the flight compartment. The 757PF is certified for the carriage of two flight crew members and five supernumeraries. The proposed AFM limitations of the supernumeraries for the 767-300F are identical to the limitations governing the 757PF. Both models utilize escape ropes for evacuation means.

"Substantiation of Evacuation Capability

"Further justification for the petition is the evacuation demonstration successfully conducted for 757PF certification on January 14, 1987. The demonstration was conducted on a passenger Model 757-200 airplane modified to represent the 757PF in the applicable areas. The evacuation demonstration involved five males and two females ranging in age from 29 to 52 and of varying physical stature. The right-hand number two window was chosen for demonstration because it was selected as the most critical evacuation route from the flight compartment. For this test, the co-pilot and the pilot had their seats in the forward position, seat belts fastened, and the right-hand

number two window closed and latched. At the signal for evacuation, the co-pilot unfastened his seat belt, moved the seat aft, opened right-hand number two window, and deployed the escape rope. After the escape rope was deployed, the co-pilot evacuated from the airplane. After the co-pilot reached the ground the five supernumeraries and the pilot evacuated the airplane. The evacuation was completed in approximately 73 seconds.

"Conclusion

"FAR 25.807(c)(1) and (c)(5) require a Type III exit for each side of the fuselage. This requirement provides sufficient evacuation capacity for passengers. The Model 767-300F flight compartment has three emergency exits and a proposed occupancy limit of seven people. The flight compartment will be limited to a ratio of two flight crew members to five supernumeraries. The category of supernumeraries to be carried aboard the 767-300F will be limited and controlled by the AFM.

"FAR 25.809(f)(1) requires a self supporting slide or equivalent at each passenger emergency exit. The assist means provided at the 767-300F entry door will be a rope, the same assist means as provided at the flight deck windows. The proposed AFM limitation that the operator instruct the occupants in the use of the ropes, and determine that the occupants are physically able to use these ropes provides an equivalent level of safety.

"In view of the fact that there are three emergency exits for the proposed seven occupants, that the evacuation capacity for these occupants has been substantiated by test, and the restriction that these occupants must meet the proposed AFM limitations, there will be a level of safety equal to that provided by the rules from which the exemption is sought."

A summary of Boeing's petition was published in the Federal Register on June 27, 1994 (59 FR 33036). Eight comments were received, all of which were opposed to the petition, as follows:

(1) The first commenter is both a commercial freighter and military reserve flight crewmember who participated in an emergency evacuation involving seven crewmembers, via the available slide. This commenter believes that use of the slide allowed an expeditious evacuation before smoke inhalation disabled the crew, and prevented injuries that would have been incurred while descending a rope.

(2) A second commenter with similar background who participated in the same emergency evacuation expresses similar opinions. But this commenter adds that an injured crewmember would not have been able to evacuate down a rope.

(3) A third commenter representing a pilots' organization contends (in two separate submittals) that the Boeing 757-200PF cockpit rope evacuation demonstration referenced as justification in this petition was inadequate, because it was conducted under ideal ambient conditions, potentially hazardous fuselage-mounted protrusions were removed, and most evacuees actually fell from the rope but escaped injury due to thick safety padding provided for the demonstration. The commenter notes that his organization did not exist at the time that "no comments were received" in response to the 757-200PF exemption petition. This commenter also recalls a recent DC-10 hijacking during which a crewmember was injured, and points out that his subsequent emergency evacuation was effected using the available slide, but could not have been accomplished if only ropes were provided. The commenter observes that in the most recent five incidents involving cargo aircraft, the cargo did not shift sufficiently to preclude use of a slide installed, and is therefore not a valid reason to remove slides from aircraft intended for cargo only service. The commenter further notes that half of the companies operating cargo airplanes have slides in lieu of ropes on at least some of their equipment (implying that this is a large percentage considering an assumed weight and cost penalty for slides vs ropes). Finally, this commenter states that unlike periodic training requirements for slides, there is no in-service "hands on" training being required using ropes, because ropes are considered unsafe and training procedures involving their use would result in unacceptable medical costs.

(4) A fourth commenter representing another pilots' organization states that using ropes for emergency evacuation is beyond the capabilities of most people generally, and especially does not allow for use following injury. This commenter also expresses the belief that a rope would not be a safe means of descent for a pregnant evacuee. The commenter also characterizes the 757-200PF demonstration discussed above as inadequate and unfairly contrived for the same reasons advanced by commenter number three.

(5) A fifth commenter representing an association of flight attendants identifies the significant differences between the 757-200PF door configuration, which was not built in a manner that would accommodate a slide, and the proposed 767-300F door which is unchanged from the passenger configuration with slide. This commenter therefore feels that the basis for any grant of exemption for the 757-200PF is therefore not applicable for the 767-300F.

(6) A sixth commenter representing a union opposes allowing the 767-300F to operate without a slide, on the basis that ropes are unsafe and do not allow for the evacuation of the injured.

(7) A seventh commenter who is an airline captain urges the retention of slides, since even though he guesses he may have been capable of using a rope when he was younger, he is doubtful of being able to do so today. This commenter also points out that ropes are useless to injured occupants.

(8) An eighth commenter, a United States Congressman who is Chairman of the Subcommittee on Aviation, Committee on Public Works and Transportation, submitted to the docket a letter written earlier, on September 9, 1993, to the FAA Administrator. The Congressman opposes

the use of ropes as the sole means of emergency egress in cargo airplanes, declaring that allowing such a practice because of the relatively few number of occupants is inexcusable and inhumane. This commenter states that if the FAA required periodic training on ropes, it would become clear how dangerous the ropes are. The commenter points out that only cargo planes are permitted to carry hazardous and toxic materials, the fumes of which subsequent to an accident may disable occupants who can not evacuate expeditiously via a slide. This commenter also notes the readily available flotation afforded by a slide, that must be provided by other means on airplanes equipped only with ropes.

(9) Virtually all of these commenters have also included the sentiment that cargo airplane occupants are people, too, and deserve the same safe means of escape as that afforded to occupants of passenger airplanes. In addition, many have asked the FAA to redraft the regulations to require slides on cargo airplanes.

The FAA's analysis/summary is as follows:

The FAA appreciates the extent and scope of the comments received in response to the Federal Register notice of this petition, and is generally sympathetic with the spirit of those comments. However, comments that were beyond the scope of the specifics of this petition, such as those that propose certain regulatory changes, are only appropriate to a petition for rulemaking, and are of necessity not dealt with herein.

Part 25 aircraft certification regulations address airplane occupants as being either "crew" or "passengers." Due to differences in their training, physical capabilities and other considerations, the means required by part 25 to enable flightcrew members to reach the ground differ from those required for passengers. In that regard, ropes are allowed as the sole means of escape for flightcrew members. On the other hand, slides or equivalent means are required for passengers. Since supernumeraries are not crewmembers, they must be considered "passengers" with respect to part 25 by default. Nevertheless, it has been recognized that supernumeraries do hold a special status because of their unique training and other considerations. The FAA, therefore, granted certain exemptions to allow the carriage of supernumeraries on cargo airplanes without compliance with all of the standards of part 25 for passengers provided certain conditions were met. Those conditions have varied, depending on the airplane design, the nature of the proposals under consideration, and the number and location of persons to be carried.

In evaluating those petitions and establishing the conditions under which supernumeraries may be carried without compliance with all of the part 25 standards for passengers, the FAA has taken into consideration the fact that, to a limited degree, they would be required to possess the knowledge and capabilities normally associated with flightcrew members. In effect, the protection normally required for passengers is required for supernumeraries to the greatest extent practicable considering equipment

limitations inherent in the proposed cargo accommodations and operations. Wherever compliance with the requirements for passengers is not feasible, compensating knowledge and training must be provided to preclude an adverse effect on safety.

Section 25.807(d)(1) requires one Type IV (19"x26") emergency exit on each side of the fuselage for nine or fewer passengers. In lieu of providing a Type IV exit on each side for the supernumeraries, the petitioner proposes to provide one larger Type A (42"x72") exit on the left hand side of the fuselage only. Although no passenger exit would be provided on the right hand side, the petitioner notes that the flightcrew exit in the right-hand side of the cockpit would be available for use by the supernumeraries. In view of the very large exit that would be available on the left hand side and the flightcrew exit available on the right, the FAA considers that arrangement to be acceptable insofar as the type and location of exits are concerned. This position, which is consistent with precedents, is based on the condition that procedures are established to ensure that the supernumeraries are actually capable of using the flightcrew emergency exit.

The two letters comprising the petition state that, unlike those of the passenger 767, one of the flightcrew emergency exits of the 767-300F can not be opened from the outside. There is, however, some confusion between the letters as to which exit can not be opened from outside. The letter dated March 14, 1994, implies that the left-hand exit is no longer openable from the outside, while the May 26, 1994, letter states that the right-hand exit is not openable from the outside. In any event, the right-hand cockpit exit must be openable from the outside, in order to serve as the emergency exit on the right hand side of the fuselage for the supernumeraries.

Although the petitioner quoted § 25.809(f), it is assumed that relief is only requested from the assist means required by § 25.809(f)(1) for passengers since the petitioner apparently intends to provide the assist means required by § 25.809(f)(2) for crew members. Accordingly, the petition was reviewed in context with similar previous initial approvals of existing passenger airplanes reconfigured into cargo versions accommodating supernumeraries. From the information currently available, it appears that the overwhelming majority, if not all, were initially approved based on proposals that included the retention of at least one slide. Among those airplane models are the Douglas DC-6, Boeing 707, Boeing 727, Boeing 747, Lockheed L-1011, Airbus A300, Airbus A310, Douglas DC-8, Douglas DC-10, and Douglas MD-11. As a precedent for granting this exemption for the 767-300F, the petitioner cites what appears to be the sole exception in this regard--the 757-200PF. In order to accommodate a certain interior arrangement, the 757-200PF was configured with a new small inward opening crew entry hatch with a high sill in lieu of retaining the passenger entry door (with slide) at that location. That hatch would not accommodate any existing slide design, and the proposed rope for evacuation from that hatch was consequently allowed by Exemption No. 4808 issued on June 9, 1987. The petitioner's

proposal for the 767-300F does not identify any feature of the entry door that differs from the 767 passenger airplane and would preclude retaining the slide. The FAA does not concur with the petitioner's assertion that the proposed rope for this location would provide an acceptable level of safety, and has determined that the slide should be retained as a condition for the carriage of supernumeraries on the 767-300F. The FAA recognizes that the existing cockpit window rope is the only means of escape from the right side of the airplane. That is considered acceptable since it is consistent with the requirements for flightcrew assist means and is compensated by the much greater evacuation capability available on the left side. The evacuation capability provided on the left side is consistent with that required for the carriage of a large number of passengers. It is anticipated that the slide would be the overwhelmingly preferred means of escape, offering the most expeditious and safest means to any occupants, and possibly the only means to injured occupants. Nevertheless, each occupant must have demonstrated the ability to use the rope in the event circumstances preclude use of the slide.

In view of the above, the relief requested from the requirements of § 25.809(f)(1) for the Type A passenger emergency exit installed on the left hand side of the airplane is denied.

It is noted that the petitioner did not petition for an exemption from the provisions of § 25.857(e) which limits Class E cargo compartments to all-cargo airplanes. Since compliance with that section would negate the relief sought from §§ 25.807(c)(1) and 25.809(f), it appears that the petitioner inadvertently omitted § 25.857. Since it was obviously the petitioner's intent to include that section, the FAA has considered the petition accordingly.

In consideration of the foregoing, I find that a partial grant of exemption is in the public interest and will not affect the level of safety provided by the regulations. Therefore, pursuant to the authority contained in §§ 313(a) and 601(c) of the Federal Aviation Act of 1958, delegated to me by the Administrator (14 CFR 11.53), Boeing Commercial Airplane Group is hereby granted an exemption from §§ 25.807(c)(1) and 25.857(e) of the Federal Aviation Regulations. The petition is granted to the extent required to permit type certification of the Boeing model 767-300F freighter airplane with provisions for the carriage of persons other than flight crewmembers, when the airplane is equipped with a floor-level exit with escape slide, and a right-hand flightcrew window emergency exit that is openable from the outside, as discussed above. The following limitations apply:

1. The airplane flight manual must contain a limitation that occupancy is restricted to a maximum of seven persons;
2. Occupants are limited to the categories specified in §§ 121.583(a)(1) through (7);

3. The operator must determine that each occupant has the demonstrated physical ability to safely accomplish emergency evacuation procedures from all exits, and;
4. Each occupant must be briefed by a flight crewmember on the use of all available emergency equipment and exits prior to each flight.

Issued in Renton, Washington, on

Transport Airplane Directorate
Aircraft Certification Service, ANM-100